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IS PAEDISCA SCUDDERIANA A GALL-MAKER?

BY D. S. KELLCOTT, BUFFALO, N. Y.

A gall from a Golden-rod, out of which a moth of this species has escaped, is figured in Second Report Insects of Missouri, page 134. In the accompanying description the author says: "There are some doubts in my mind as to whether it is a real gall-maker, or an inquiline, or an intruder on my true Solidago gall-maker (*Gelechia gallæsolidaginis*). "My reasons for thinking this insect an intruder are, first, because if it were a true gall-maker, we should naturally expect to find its gall more common; second, because on several occasions I have found within the *Gelechia* galls a pale worm very different from the true gray gall-making larva." In the CAN. ENT., x., 202, I asserted, perhaps too abruptly, that this moth is not an intruder, but the cause of the gall in which it resides during the larval and pupal states. In the paper cited I gave my reasons for this conclusion, reasons which I considered sufficient, namely: that it was very abundant about Buffalo, that I had followed the larvæ in the galls from soon after hatching and soon after they had pierced the stem until final transformation, and that their gall habits were somewhat characteristic. In Bulletin No. 6 of the United States Entomological Commission, page 57, referring to this species (under the name *Euryptychia saligneana* Clem.), Mr. Riley says: "From comparison of female specimens I am led to believe that this is the same species that is commonly known in Europe as *Spilonota roborana* Schiff. . . . The insect in Europe is known to feed on the leaf-buds of the rose. I have abundant proof that in this country it is not a gall-maker, but as was inferred in the Report, an inquiline. I have found its larva feeding upon the flowers as well as amid the terminal leaves of the Golden-rod, and I have also found it in other galls." The above statements have led me to again examine the matter, and inasmuch as I cannot find evidence in support of the writer's views, but rather to confirm my own, I desire to record my observations.

This year I noted that the *Gelechia* galls were of full size before *P. Scudderiana* escaped from the pupa, and *G. gallæsolidaginis* escaped from

its gall before those of the other were completely formed. These were observed as slight swellings or rings about the middle of July, and to grow quite slowly, attaining full size by the beginning of September; besides, the *Paedisca* galls, as a rule, are in entirely different situations, as pointed out in the previous paper referred to. The *Gelechia* galls are ordinarily on the stem below the branches, and usually only one occurs on the same plant; the other forms them higher among the branches, or, as often happens, on the branches themselves. As many as eleven galls have been counted on one plant. Likewise the differences of form, structure, position and date of appearance between this gall and that of *Trypeta solidaginis*, render it quite improbable that the one has any relation to the other. There is no other known gall that could be suspected.

I have again this summer observed larvæ of this species of all sizes in galls of corresponding sizes, from mere protuberances on the tender stems up to the well formed characteristic galls. This, it seems to me, is direct evidence of its gall-making habits.

The following experiments have a tendency to confirm such belief. Some Golden-rods, late in June, were planted in a bottomless pail sunk in the earth of my garden and closely covered by a net of tarlatan; some days later several old galls containing living pupæ were placed under the net. Early in July moths were observed within. August 8th the net was removed and several small yet unmistakable *Paedisca* galls were found on the Golden-rods. September 11th, the same are nearly of the usual size at maturity; no larvæ have appeared among the leaves at any date since the cover was removed. August 10th, I removed about a dozen of different sizes from their galls to the leaves and flowers of the above mentioned isolated plants; in a day or two all had disappeared except one which was boring into the stem at the axil of a branch, and at the end of a week it had caused a slight gall-like enlargement of the same. At another time a number of larvæ of different sizes were taken from their galls and placed on leaves and flowers of their food-plant in a feeding box; they refused to feed, and after days of ceaseless effort to escape died of starvation. Perhaps this result should have been expected, rather than submission to so material a change of food and residence.

After diligent search I have not found what I take for this larva feeding on the leaves or flowers, and in but one instance have I found it in any but its own gall, then in what was apparently an abandoned one of

the *Gelechia*, in which, as it seems to me, it had taken refuge after an accident to its own home.

I do not deny, however, that it may feed elsewhere upon leaves and flowers of the Golden-rod, or that it may occupy other galls; but I feel sure that, at least in this vicinity, it habitually makes the abundant gall in which it resides.

DESCRIPTION OF THE PREPARATORY STAGES OF *NEONYMPHA AREOLATUS*, SMITH-ABBOT.

BY W. H. EDWARDS, COALBURGH, W. VA.

EGG—Nearly globular; the surface smooth under a low power, but under a high one, thickly covered with shallow depressions, which are irregular in size and also in form, being pentagonal, rounded or oval; color pale green. Duration of this stage about 6 days.

YOUNG LARVA.—Length .12 inch; cylindrical, nearly even, tapering a little posteriorly, the last segment bluntly forked; color delicate green; over the surface many white hairs, and among these are black clubbed hairs disposed in longitudinal rows, four on the dorsum of each segment, two in front, two in rear; feet and legs green; head large, about twice as broad as any body segment, sub-globose, a little depressed at top; on each vertex a short semi-ovoid appendage, at the top giving out two divergent black hairs; just below vertex, on the front, is a similar smaller appendage with single hair, and on the side half way down is a second; color black. Towards the end of this stage the color of body changes to decided green, and several longitudinal stripes appear; on either side of a dark green medio-dorsal stripe is a whitish one, a similar one on middle of side and another along base. Duration of this stage about 8 days, but depending on the weather.

After 1st moult—Length .22 inch; slender, the dorsum slightly arched and sloping posteriorly; the tails longer, tapering; color of body green, the tails faintly red; surface quite thickly covered with fine yellowish tubercular points, partly arranged in longitudinal rows, ten in all, on either side one next the medio-dorsal green stripe, one sub-dorsal, two on mid-side and one along base; under side, feet and legs green; head ovoidal, truncated, depressed at top; on each vertex a low conical process; surface rough with sharp tubercles, of varying size, each with very short bristle;

color of back of head and of the triangle over mandibles deep green, the rest of the front and the processes on vertices red-brown, with two green patches on front, one on either side the suture; ocelli emerald-green. But some larvæ have the head wholly green, the vertex process reddish; one had a brown band across the forehead, the rest green; one had the front face except the triangle brown, the cheeks green. To next moult about 9 days.

After 2nd moult.—Length .3 inch; shape as before; color yellow-green; stripes as before; head as at second stage, sometimes wholly green, sometimes partly brown; one example had the left cheek brown, the other green. To next moult about 7 days.

After 3rd moult.—Length .7 inch; very slender, yellow-green. In all examples bred by myself this was the closing larval stage.

MATURE LARVA.—Length 1.1 to 1.3 inch; slender, thickest in middle segments, the dorsum well arched, and the slope equal either way to 2 and 12; segments 3 and 4 are creased, and divided into five rounded and nearly equal ridges; after this, there are six ridges, the front one broader than any other and flattened, the rest being somewhat rounded; 13 ends in two small tapering divergent tails; color of body yellow-green; surface thickly covered with small sharp tubercles placed irregularly, but most dense in certain longitudinal lines, one such on either side of the medio-dorsal dark stripe; one sub-dorsal from head to end of tail; two on the side, and one, more conspicuous, along base, ten lines in all; tails reddish; under side, feet and legs, green; spiracles buff; head obovoid, truncated, the top depressed; on each vertex a little conical process, reddish; surface rough with fine green tuberculations, among which are a few whitish ones, each with short white bristle; ocelli emerald-green in brown rings. Duration of this stage about 13 days.

CHRYsalis.—Length, ♂ .48 inch; greatest breadth at mesonotum and also at abdomen, .18 inch; ♀ (probably) .54 inch, breadth .20; cylindrical, the abdomen stout, conical; the wing cases a little raised on dorsal side; head case very short, scarcely projecting beyond mesonotum, bevelled transversely to a sharp edge, roundly excavated on either side, the top very little incurved; mesonotum rounded, carinated, the sides nearly flat or a little excavated; color green, the edges of carina, wing cases and top of head case cream-color; surface much covered with points and small patches of whitish, not distinct enough to detract from the general green hue. Duration of this stage about 10 days.

In 1882, I carried three larvæ to chrysalis, and all passed but three moults. I received these larvæ from Dr. Wm. Wittfeld, Indian River, Fla., 17th July. He mailed the eggs 11th July, and had obtained them by confining a female over grass. When the larvæ reached me they were in their first stage, and the

1st moult was passed 20th July.
 2nd " " 29th "
 3rd " " 5th Aug.
 2 larvæ suspended 16th "
 They pupated 17th "
 A third " 20th "
 Imago from last chr. (♂) 30th Aug.

(The other chrysalids I put in alcohol.)

But Mrs. Peart carried one larva to chrysalis, and it passed 4 moults. This came from

Egg laid 7th May, 1882.
 Egg hatched 12th "
 1st moult 2nd June.
 2nd " 15th "
 3rd " 3rd July.
 4th " 15th "
 In chr. 28th "

I have the casts of the face of this larva, which so passed 4 moults, and can compare them with casts from the larvæ raised by myself, calling the former A, the latter B:

A.—Diameter of head at 2nd moult, .023 in.; B, same stage, .023.

" " 3rd " .04 " " .057.

" " 4th " .065

" " chry. .1 " at chry. .08.

So that A and B were alike at 2nd moult; B at 3rd was between 3rd and 4th of A, and at pupation was smaller than A. In fact the larva which passed 4 moults was larger than either of mine, and the chrysalis from it measured .54 inch in length, against .48 in the other case. This chrysalis failed to give an imago, but probably it was a female, and it is possible that the difference in number of moults may be sexual.

I have had great difficulty in bringing larvæ of *Areolatus* to maturity, and I may say the same of *N. Canthus*, and in repeated instances have failed when feeding them on lawn grass. The eggs of both species are

naturally laid on coarse grasses, and I found, this season, that by selecting *Dactyloctenium aegyptiacum* the larvæ fed more readily than before and were healthy.

Areolatus is common in Florida and Georgia, and has been taken by Mr. E. M. Aaron on the summit of one of the high mountains of East Tennessee.

CLOTHES MOTHS.

BY PROF. C. H. FERNALD, STATE COLLEGE, ORONO, MAINE.

Nearly a year ago my attention was especially called to the insects which prey upon woolen fabrics, and which are generally known as "clothes moths." In going over the literature of the subject at that time and comparing it with the notes which I had made from time to time, I became convinced that what we have in our books pertaining to these insects is very imperfect and faulty, and that there was need of a thorough revision. This held true, not only of the species which destroy clothing, but also of many other species in the family *Tineidae*.

I therefore obtained, by purchase and otherwise, as large a collection as possible from all parts of the United States—over twelve hundred specimens—and sent them to Lord Walsingham, in England, for comparison with the European species. This collection has just been returned to me, and the notes and descriptions which his lordship has made on it will soon appear in the *Trans. Am. Ent. Soc.*

From the studies thus far made it appears that such of the European species as attack clothing have already been introduced into this country, and the probabilities are that we have no native species possessed of similar habits.

In 1841, Harris's *Insects of Massachusetts* appeared, in which a general account of clothes moths was given, taken from Duponchel and other European works, and including a brief description of a moth attacking white flannel in the cases of the Boston Society of Natural History, which, as he stated, agreed with the description of *Tinea flavifrontella* of the older naturalists. Harris omitted to mention whether or not the larva of this species made a case of the flannel in which it lived. Later editions of Harris's work merely repeat the same thing.

Dr. Packard, in his *Guide to the Study of Insects*, p. 346, described

the clothes moth under the name *Tinea flavifrontella*, Linn.; but Linneus never described a species under this name. Packard has confounded two species in his account in the Guide, and also in his Common Insects, p. 64, as shown by Lord Walsingham. His larva is that of a case-making species—*Tinea pellionella*, Linn., while his imago is that of *Tineola biselliella*, Hum., the larva of which does not make any case. See also Am. Nat. Vol. I., p. 423, and the Report of the Ent. Soc. of Ontario, 1873, p. 27.

Clemens and also Chambers have redescribed the introduced European species as shown in the synonymy below. *Tinea pellionella*, Linn., *Systema Naturæ*, 10th edition, p. 536, 1758, is our only case-making clothes moth, so far as I can ascertain, and although redescribed under other names in this country, it has been easily recognized by European entomologists, from the description of Linneus and the earlier accounts of Reaumur. This species has an expanse of wing from 10–14 m. m. The head is of a dull ochreous color, the fore-wings grayish ochreous, with three fuscous spots, one at the end of the cell, another on the fold, a little before the middle of the wing, and the third on the cell above the last-named spot. These spots are scarcely visible, except in fresh specimens. Hind wings silky gray, lighter than the forewings. The case which this species constructs is well described in Packard's writings mentioned above. This is, in this region, our most common and destructive species, attacking all kinds of woollen clothing, carpets, furs, feathers, etc. I have bred this insect repeatedly, and find that it feeds during the summer but not in the winter, even when kept in a room warmed by a furnace where the heat was uniform day and night. The moths emerge in June and July, and some even as late as August, yet there is but a single generation annually, so far as I have observed.

Tineola biselliella, Hum. Ess. Ent., 3, 13, p. p. 6–13; 1823. This species was separated from the genus *Tinea* by Herrich Schæffer, because of the absence of the maxillary palpi. It has an alar expanse of about 14 m. m. The head is dull ochreous, differing but slightly from that of *pellionella*. Fore-wings pale ochreous, without spots. Hind wings somewhat lighter. This insect does not construct any larval case, but according to Stainton, webs together portions of the substance upon which it feeds into a cocoon before changing to a pupa. It feeds on woollen stuffs, furs, feathers, horse-hair, linings of furniture, dried plants, etc. Packard describes the imago of this species under his *Tinea flavifrontella*.

Tinea tapetzella, Linn. *Systema Naturæ*, 10th ed., vol. I., p. 536, 1758. The alar expanse of this insect is about 18 m. m. Head and face white. The wings black from the base to the middle and white beyond, the black color extending out a little further on the costa than on the hinder margin. The white of the outer portion of the wing is more or less clouded with dark gray, and there is a small black spot at the anal angle, and two or three at the apex of the wing. Hind wings pale gray. This species is apparently quite rare in this country. The larva in Europe feeds on animal matters, pelts, felts, carpets and also on dried plant substances, forming a gallery of the substance on which it occurs, thus destroying much more than it eats.

In 1776 Denis and Schiffermiller published a catalogue of the insects in the Royal Museum in Vienna, giving very brief descriptions of the species, one of which they called *Tinea flavifrontella*, and their description was as follows: "Shining gray moth, with yellowish head. Larva unknown." The type in the Vienna collection was long ago destroyed, and from this meagre description it is now impossible to tell what the insect is. Fabricius next used the name in his *Entomologia Systematica*, Vol. 3, part 2, p. 305, (1794), for an insect in the collection of Bosc, and states that the larva feeds on insects and feathers, but it is not certain that he ever saw the type in the Vienna collection, if, indeed, it was even then in existence.

In 1801, Illiger issued a second edition of the Vienna catalogue, and gives not only what is in the original edition, but adds the description by Fabricius, which may not pertain to the Vienna moth at all. In 1821 Charpentier published the notes which he made on an examination of the insects in the Vienna collection, and states that the type of *Tinea flavifrontella* was not in the collection, but at what time it was destroyed I am not able to learn. In 1833 Treitschke published the description of a moth under the same name, giving the credit to the Vienna catalogue, but it is quite certain that he did not know the original type of *Tinea flavifrontella* for it had disappeared long before he made his studies on the microlepidoptera.

In 1823, Hummel described a clothes-destroying moth, under the name of *Tinea biselliella*, which was, without much doubt, identical with the species described by Fabricius, Hubner and Treitschke, but as they had used the name given in the Vienna catalogue for an unknown and per-

haps different moth, the name *biselliella* is now universally accepted, and *flavifrontella* is dropped from the lists.

The synonymy of the above species is as follows :

TINEA PELLIONELLA, Linn. *Systema Naturæ*, Vol. I., X., Ed.

1758.

Tinea carnariella, Clem. Proc. Ac. Nat. Sci. Phil., pp. 257, 258. 1859

Tinea griseella, Cham. Can. Ent. V., p. 88. 1873.

Tinea flavifrontella. Pack. Guide, p. 346 (larva only). 1872.

This is our case-making species, and should be known by the name of *Tinea pellionella*, Linn.

TINEA TAPETZELLA, Linn., *Systema Naturæ* Ed. X., Vol. I., p. 536. 1758.

This is a gallery-making species.

TINEA BISSELLIELLA, Hum. Ess. Ent. 3, 13, p. 6-13. 1823.

Tinea Crinella, Treits Schm. von Eur., B. IX., p. 21. 1832.

Tinea Destructor, Steph. Ill., Vol. IV., p. 346. 1834.

Tinea Biselliella, Zell. Isis. 1846.

Tineola Biselliella, H.-S. Schm. von Europa, Vol. V., p. 81. 1853.

Tinea lanariella, Clem. Proc. Ac. Nat. Sci. Phil., p. 258. 1859.

Tinea flavifrontella, Pack. Guide, p. 346 (imago only). 1872.

This is not a case-making species. It should be known by the name of *Tineola biselliella*, Hum.

NEW MOTHS.

BY A. R. GROTE, A. M.

Copablepharon Longipenne, n. s.

Eyes naked ; tibiæ spinose. Fore wings clear light buff yellow with an outer line merely a succession of minute dots, at usual place of s. t. line. Hind wings fuscous with pale fringes. Head and thorax yellow ; pectus and palpi whitish. Beneath the whitish wings are clouded with pale fuscous. A little slighter than *Absidum* (= *Aedophron grandis* of Strecker). Montana Coll. B. Neumoegen, Esq.

Copablepharon Subflavidens, n. s.

Eyes naked ; tibiæ armed ; fore tibiæ with a very slight claw in addition. Primaries pure light yellow, immaculate. Hind wings pure white,

immaculate. Abdomen white; white beneath. Montana, Coll. B. Neumoegen, Esq. Size of the other species. *C. Album* is also in the collection before me.

Arsilonche Henrici Gr.

After examining specimens of the European *Albovenosa*, not one was the same as *Henrici*, which is not so strongly marked. I conclude that Mr. Morrison has been hasty in pronouncing them the same.

Mamestra Gnata, n. s.

♂. Allied to *vicina* (= *teligera*) but differing by larger size, darker color and the rounded not kidney-shaped reniform. Hind wings white, iridescent, with dark veins. Primaries with straight costa and determinate apices. Dark fuscous gray, with a brownish tint on median space. A pale patch before internal angle, prominent. Reniform with incomplete inner annulus, pale shaded, contrasting, rounded. Orbicular darker, smaller, a little oblique, with a fine pale ring. Head and thorax dark gray. Beneath hind wings white, no marks, costa gray. Primaries gray superiorly with discal point indicated and commencement of a mesial line shaded with white. Arizona. Coll. B. Neumoegen.

Mamestra Glaciata, n. s.

♂. Eyes hairy. Allied to *Leucogramma*. Primaries dusky olive with the lines black, vividly edged with white. Reniform and orbicular white-shaded. A white spot beyond the concolorous claviform, attached to the dark rivulous median shade line. Fringes interrupted markedly with pale. Hind wings blackish fuscous, with white-tipped fringes and faint mesial line, paler at base. Thorax and head mixed with white and fuscous scales, agreeing in appearance with fore wings. Beneath fore wings fuscous, with distinctly checkered fringes; hind wings whitish at base, with a distinct oval discal spot and double exterior shaded lines. A fine basal ray. Arizona. Coll. B. Neumoegen. Belongs to *Dianthoecia*.

This is close to the European *Magnolii*. The orbicular is larger, the olive ground color less apparent, the white more plentiful. Though closely allied, it is unlikely the two insects are the same.

Helotropha Sera G. & R.

This is allied to the European *Helotropha Leucosigma*.

Apamea Inquaesita G & R.

This species is incorrectly cited in my "New Check List" as

"Gortyna quaesita." How the error occurred I cannot now tell. The species of these two genera should read as follows, synonyms omitted:

Helotropha Led.

Sera G. & R.

Reniformis Gr.

Var. Atra Gr.

Apamea Tr.

Purpuripennis Grote.

Juvenilis Grote.

Nictitans Esp.

Inquaesita G. & R.

Erepta Gr.

Immanis Guen.

Obliqua Harv.

Stramentosa Guen.

Thalpochares Fortunata, n. s.

Size small. Front embossed. Vestiture of flattened scales. Aspect of *Patula*. Fore wings deep yellow, shading to whitish over head and thorax, and with a pale terminal even shade line. Primaries with no markings except a prominent broad, leaden-hued, bent median band, edged with pale, resting on inner margin and expiring on cell at about the place of the reniform. Hind wings translucent, stained with yellow; fringes whitish. Beneath the body is white and the immaculate wings suffused with deep yellow. Arizona, Coll. B. Neumoegen.

Thalpochares Perita, n. s.

Allied to *Fortunata*; wings a little narrower. Eyes naked; clypeus full. Fore wings pale yellow to a leaden band situate outside of the pale t. p. line, which is illegible; terminally the wing is clear buff yellow. Hind wings translucent, stained with yellow. Body white beneath. Wings stained with deep yellow. The band on primaries is oblique, rather narrow and expires before costal region. Arizona. Coll. B. Neumoegen.

Melicleptria Celeris Grote.

A true *Melicleptria*, as I find from a fresh example in Mr. Neumoegen's collection. Hind wings brilliant orange red, concolorous. Fore wings with the usual pale blotches confined to a couple of pale spots at middle, vinous purple, slightly overlaid with sericeous. Thorax with the usual silky, olive or yellowish, hair. Abdomen blackish above. It may head the series as arranged in my "New Check List."

Oxylos citrinellus G. & R.

Eyes a little narrower than *Heliothis*, naked, unlashd; tibiæ spinose; fore legs with a claw and three outer curved spines, besides the spinules. Only slightly by the armature of the front legs and the narrower eyes and smoother front does this differ from *Heliothis*, and I should prefer not to separate it in future. *Lucens* and *Spinosa* are doubtfully in their right place, and I should prefer to restrict *Heliothis* to *armiger*, *phlogophagus* and *luteitinctus*, *lupatus*, *citrinellus*, *cupes* and *nuchalis*.

Tripudia Gr.

In *T. Versuta*, the lashless eyes are naked; ocelli; tibiæ slender, unarmed; front smooth; a ridge of scales behind the head. Sub-basal space ochery; basal dark fuscous; median again darker, narrow; a rivulous black median shade; t. p. line black, roundedly exserted opposite reniform which is defined by a lilac shade; s. t. line irregular, much shaded before with black, partly followed by a lilac shade; s. t. space anteriorly ochery; squamation lustrous; beneath discolorous with a pale streak along internal margin and some yellow specks along costa; hind wings broken up with whitish and a dark discal lunule. *Type* Coll. Neu-moegen. Whether distinct from *Flavofasciata*, I am not now certain. The species is minute, pyralidiform.

Spragueia Grote.

This genus is so distinct from the European *Erotyla*, with its one species, by the neuration, as I have shown, that to unite it would oblige every genus in the sub-order dependant on neuration, to be subverted. Dr. Herrich-Schaeffer expressed his opinion to me that the two were distinct. The fore wings are narrower, the clypeus differs, the ornamentation is peculiar in *Spragueia*. We have many species; the genus comes to our fauna from the South.

Matigramma Rubrosuffusa, n. s.

This species is fuscous, the underlying tint is a pale reddish, appearing in the pale red subterminal line. Male antennæ ciliate. A little larger than *Laena*, which is wholly griseous and fuscous. Fuscous lines double, marked on costa of primaires; s. t. line continuous, more broken into dots on primaries. Fringes indistinctly checkered. Upper surface of wings similar; the hind wings show a pale streak on submedian space; fringes on internal margin whitish. Body concolorous. Beneath ashen;

a fine common angulate dark mesial line. Very indistinct discal dots; an inner line on fore wings; outwardly the wings are darker. Arizona; larva on scrub-oak, chrysalis pruinose (I. Doll, Esq.)

Tripudia Lixiva, n. s.

Size small. Eyes naked. Scales of the body flattened. Palpi incurved; third article exceeding the front. Base of fore wings gray. A very broad median olive brown band, bordering t. a. line outwardly, interrupted at costal region. T. a. line a little waved, pale, emanating from a small black costal spot. A large black costal spot at middle, inaugurating the pale narrow, sinuate median shade line, forming the outer margin of the olive brown band; terminal portion of wing reddish brown, on which the vague reniform is apparent. S. t. line irregular, dark shaded superiorly, waved; terminal space slightly grayish; fringe yellowish, interrupted by a blackish spot opposite cell. Body and hind wings gray. Arizona. Coll. B. Neumoegen.

Allied to *Opiparus*, but smaller, the median fascia broader, the outer half of the wing redder and more like *Basicinerea* in this respect.

Eugonia Vidularia, n. s.

♀ Apices of primaries pointed; outer margin strongly angulate opposite cell; hind wings "tailed." Very pale yellowish. An outer dark narrow line, fainter inferiorly, continued across hind wings. On fore wings the surface is a little darker about the inception of this line and on secondaries without it. At apical excavation the fringe is dark. Beneath still paler, irrorate; a narrow common line and slight discal marks. Disc of thorax buff or darker; body pale. Size of *alniaria*, but slighter. Arizona. Type Coll. B. Neumoegen, Esq.

Cymatophora (Boamira) Dataria, n. s.

♂. ♀. Allied to *Pampinaria*. In the male the median lines are shaded with black, in both sexes propinquitous, very oblique, angulate, followed by an indistinct (♀) or distinct (♂) brown shade occupying the anterior half of subterminal space. S. t. line scolloped, distinctly marked with white in male. Hind wings gray at base (♂), or concolorous (♀). The color of female is more obscure fuscous. Mesial line bent opposite cell. A faint annulus. The outer field beyond the line copies the markings of primaries. Size of allies. Beneath gray, discolorous with discal marks diffuse, blackish, wanting on hind wings in male. Types. Coll. B. Neumoegen, Esq., Arizona.

Lythria Fultaria, n. s.

♂. Aspect and color of *Fidonia*. Front wide, even; eyes naked; ♂ antennae strongly setose; labial palpi, exceeding the front, loosely haired. Wings entire, roundedly bent at middle. Body slender. Fore wings with alternate fuscous and pale reddish bands; veins a little marked; fringes black, except at apices where they are white. Hind wings dark yellow with black marginal band and a sub-basal line ending the darker basal field; a mesial band enclosing a yellow streak. Beneath fore wings dark yellow with a mesial black line, angulate and touching the black discal spot. A pale apical patch; an outer bent subterminal line beyond which the wing is blackish. Hind wings dull like primaries above, pale reddish brown with two brown bands. Arizona. Coll. B. Neumoegen, Esq. This may belong to a different genus; the colors are those of *Botis subsequalis*. Again here I note the singular way in which the upper wings beneath are like the lower above and *vice versa*. I allude to this in my essay; it must be dependent on the exposure of the surfaces.

Cyclica, n. g.

I refer to the *Larentinae*, a singular large-winged Geometrid with the primaries unusually long and wide and produced apically. Hind wings much elongated; cell closed; veins 2, 3, 4, 5 nearly equi-distant; submedian space wide. Labial palpi prominent. Clypeus uneven; eyes naked; no ocelli; ♂ antennae serrate, ciliate.

Cyclica Frondaria, n. s.

♂. The form is an exaggeration of *Tornos*, but much wider winged. Fore wings blackish, thinly scaled; paler below median vein, outwardly. Some black and white marks along submedian fold and two or three oblique black apical marks. Indications of transverse bands but all obscure. Hind wings pale fuscous with dark marginal line. Beneath immaculate, very pale fuscous, whitish over hind wings. Size large. Type Coll. B. Neumoegen, Esq. Arizona.

Fota, n. gen.

Eyes naked; fore tibiae slender, closely scaled, with a short claw. Clypeus with an exceedingly prominent wedge-shaped protuberance, surmounting the greatly exerted infra-clypeal plate. Body slender, short, untufted. Fore wings amygdaliform, narrow; hind wings wide, full; fringe long.

Fota Armata, n. s.

♀. Tortriciform. Fore wings gray, with a black shade along the cell, connecting the median stigmata and preceding the orbicular. Stigmata concolorous; orbicular round, reniform upright. A long black shade on median space over submedian fold. Lines obsolete. Fine black interspaceal terminal streak. Hind wings pale, with white fringes; abdomen pale, yellow beneath at tip. Beneath pale without marks. Size of *Hadena cylindrica*. Arizona. Coll. B. Neumoegen.

This singular genus seems to me an aberrant Hadenoid form.

Tamila Lucens Morr.

On account of the flattened scales on head and thorax I would refer this species and *Meadii* to *Tamila*. I am aware that the character is slight but by separating the species into the genera *Tamila*, *Heliothis*, *Melicleptria*, *Lygranthoecia* and *Anthoecia*, we get consonant assemblages of species, agreeing in their different characters. In the Bulletin of the Buffalo Society Natural Sciences I threw them all in *Heliothis*, but there seemed nothing gained by this and the identification of material was thereby rendered much more difficult.

Luxuriosa, n. var.

A form of *Lucens* from Montana wanting the white admixture of scales over fore wings: subterminal space dark lilac—purple; lines very fine, white, contrasting; yellow of hind wings deeper than type.

Cucullia Montanae, n. s.

♀. Allied to *Asteroides*, but with the collar wholly pale, whitish, edged with dusky. Tegulae also pale, ochrey white; thoracic tuft dusky. Ornamentation like *Asteroides*, but with the ground color pale ochrey; the black costal shades show the three pale ante-apical dots distinctly and they are larger. The stigmata much more distinct, pale, broken by ocher spots. The anal brown, streak, distinct against the pale, ochery white ground; no gray. Montana; coll. B. Neumoegen, Esq.

There is no fine black longitudinal hair line at base of fore wings and the teeth of t. a. line seem blunter. As the species are very close in this genus I have little doubt the present is entitled to a designation as such. It is quite distinct in appearance and can be at once detected. Much more distinct from *Asteroides*, than is the European *Asteris*.

Synedoida Insuperata Gr.

♂ Antennæ serrate, ciliate; eyes naked; tibiæ apparently unarmed; thorax thickly hirsute. Palpi exceeding the front, pale gray; pectus blackish. Hoary gray; median field of primaries olive-ocher, defined by the median lines of the usual shape, cut by the shaded brownish median shade, uneven and obscuring the illy defined concolorous reniform. T. p. line shaded outwardly with black below costa. Costal edge carneous. S. t. line nearly lost, indicated at costa. Hind wings fuscous with whitish fringes. Size of related species. Thorax gray; head darker. Beneath unlined, pale gray, irrorate; discal marks present. Arizona; coll. B. Neumoegen, Esq.

OBITUARY.

Charles G. Siewers died at his residence, Newport, Ky., Sept. 6th, in the 68th year of his age. For many years he has been a devoted and enthusiastic student of entomology. He spent much time in rearing the larvae of Lepidoptera, making colored drawings of them through their stages of growth. He collected largely in Coleoptera and was a very accurate observer of habits. It is due to his skill as a collector that some of the rarest species have been recorded as occurring in this locality.

CHARLES DURY.

Avondale, Oct. 4th, 1882.

ON THE MOUTH OF THE LARVA OF CHRYSOPA.

(By William Saunders, London, Ont., read before the A. A. A. S., at Montreal.)

Recently I had the opportunity of watching in a live box, under a low power of the microscope, the seizing and devouring of some plant-lice by the larva of an undetermined species of Chrysopa, and was interested in the manner in which it emptied the body of its victims. The jaws are large, hooked, pointed and tubular, with a small opening at or near the points. Approaching its prey the body of the Aphis is grasped by the hooked mandibles which at the same time pierce it. The Chrysopa larva remains stationary, and proceeds to pump its victim dry. At the base of

each of the mandibles the integuments are dilated into a sac-like form capable of expansion and compression at will, a portion of the thorax is similarly constructed, and it is by the repeated dilating and compressing of these sacs that the fluid contents of the body of the Aphis are transferred through the tubular mandibles to the stomach of the Chrysopa larva.

When the abdomen of the Aphis has been emptied, the points of the mandibles of the Chrysopa larva are thrust in the thorax, and forward into the head in every direction, and in a few moments nothing remains of the once plump plant louse but a shrivelled skin. In the author's accessible, I can find no reference to these elastic bulb-like sacs at the base of the mandibles, nor to the peculiar structure of the thorax, which admits of its expansion and contraction as referred to.

ANNUAL MEETING OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

(Continued from page 151.)

Prof. J. A. Cook stated that from the European larch he had taken about 250 cocoons of *Samia Columbia*, and found among them one peculiar cocoon, very similar to that of *Columbia*, which eventually produced a *cecropia*.

Dr. Jewett thought it was probably a case of hybridism, as he himself had taken hybrids of *Gloveri* and *cecropia*.

Dr. Hagen had seen cocoons of *cecropia* so similar to those of *Columbia* that it would be very hard to discriminate between them.

Dr. Hagen also gave a very interesting account of an expedition to the Northwestern Territories from which, in company with Prof. Henshaw, he had just returned.

In the north of Washington Territory he found the forests and country generally in splendid condition, and comparatively free from any insect pests.

In other parts he had found the Yellow Pines most seriously affected by the attacks of *Pieris marsupia* (?), large tracts of forests being entirely devastated—and large trees being attacked as well as the younger ones. The Butterfly appeared there last year for the first time—eggs were found on July 24th. The larva has the habit of dropping from the trees by a thread, a peculiarity only noticeable in a very few of the *Rhopalocerae*.

A tree once attacked never seems to recover, and the only way to check the ravages of the insect is to cut down those trees affected.

In Montana the cattle feed out all the year round on the "bunch" grass, which is of inestimable value to that country. A curious fact to be noticed is that wherever timothy and blue grass is introduced it seems to kill out the bunch grass, so that the advance of civilization may in fact entirely alter the economy of the country.

The grasses do not seem troubled as yet with any pests.

The Colorado potato bug is merely known in certain localities.

The fruit trees are troubled only by flies and ants, so that the territory is nearly free from noxious pests.

Prof. Henshaw said the expedition was one of great interest.

A curious feature was the late hours at which insects appeared to feed, many of them after sundown.

Papilio machaon was found in great numbers.

Carabide were found in dry places, whereas in the East they usually preferred moist situations.

The genus *Callopteryx* was also found. This was especially noticeable as it had never been known to occur west of the Rocky Mountains.

After this a considerable time was spent in informal discussion and examination of interesting specimens brought by members from various parts of the continent, and the meeting then adjourned.

THE GRAPE BERRY MOTH—*Lobesia botrana*.

BY THE EDITOR.

This insect is an imported species and has long been injurious to grape culture in the South of Europe. The exact period of its introduction to America is not known, and it is only within the past few years that attention has been called to its ravages. When abundant it is very destructive, in some instances it is said to have destroyed nearly fifty per cent. of the crop.

During the past season it has been very abundant in the neighborhood of London, there being very few vines the fruit of which has not been more or less injured. The young larvæ have usually been first observed

early in July, when the infested grapes show a discolored spot where the worm has entered. [See fig. 21, *c*.] When the grape is opened and the

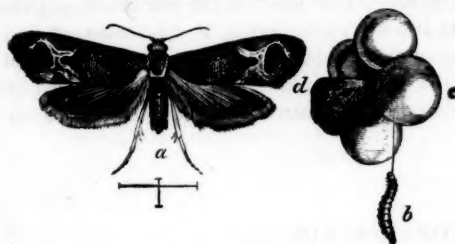


FIG. 21.

contents carefully examined there will usually be found in the pulp a small larva rather long and thin, and of a whitish green color. Besides feeding on the pulp it sometimes eats portions of the seeds, and if the contents of a single berry are not sufficient, two, three, or more are drawn together as shown in the figure and fastened with a patch of silk mixed with castings, when the larva travels from one to the other, eating into them and devouring their juicy contents. At this period its length is about an eighth of an inch or more; the head is black and the next segment has a blackish shield covering most of its upper portion; the body is dull whitish or yellowish green. As it approaches maturity it becomes darker in colour and when about one third of an inch long is full grown, see *b*, figure 21. The body is then dull green with a reddish tinge and a few short hairs, head yellowish green, shield on next segment dark brown, feet blackish, pro-legs green.

When the larva is full grown it is said to form its cocoon on the leaves of the vine, cutting out for this purpose an oval flap, which is turned back on the leaf forming a snug enclosure which it lines with silk; frequently it contents itself with rolling over a piece of the edge of the leaf, and within such retreats the change to a chrysalis takes place. The chrysalis is about one fifth of an inch long and of a yellowish or yellowish brown color, from which the moth finally escapes.

The perfect insect which is shown magnified, *a*, figure 21, measures when its wings are spread nearly four-tenths of an inch across. The fore wings are of a pale, dull, bluish shade with a slight metallic lustre, becoming lighter on the interior and posterior portions and ornamented with dark brown bands and spots. The hind wings are dull brown, deeper in color towards the margin, body greenish brown. It is said that there are two broods of this insect during the year. We have never

seen them at any other time than in the autumn when the grapes are approaching maturity.

REMEDIES.—As it is possible that most of the late brood pass the winter in the chrysalis state attached to the leaves, if these were gathered and burned a large number of the insects would perish. The infested grapes might also be gathered and destroyed. This insect is attacked by a small parasite which doubtless does its part towards keeping the enemy in subjection.

CORRESPONDENCE.

DEAR SIR: Please insert the following correction of line 12, page 156, August number: For "only these little claws rather than the usual tubercles," read "only three little claws instead of the usual circlet of tentacles."

V. T. CHAMBERS.

DEAR SIR: In preparing my article on *Homoptera lunata* in recent number of the CANADIAN ENTOMOLOGIST I overlooked the article by Prof. J. A. Lintner in his 4th Entomological contributions, where he gives good reasons for thinking *lunata* and *edusa*, and perhaps *Saundersii* but sexes of one species. I had seen his article but at the time of writing it did not occur to me.

G. H. FRENCH, Carbondale, Ill.

DEAR SIR: Mr. A. R. Grote, p. 128, July, states in favor of his opinion that Staudinger's Catalogue did not hesitate to introduce for *Pap. Podalirius* the name *P. Simon*. But Dr. Staudinger has in the same volume, Errata, p. 422, corrected this statement: "*Podalirius* nomen est *vetustius*."

H. A. HAGEN, Cambridge, Mass.

NOTES AND CAPTURES.

PAPILIO CRESPHONTES, Cram.—I saw on the street very recently a magnificent specimen of this beautiful butterfly; it was flying slowly and could easily have been captured with a net. E. B. REED, London.

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